MODIS SEMI-ANNUAL REPORT
- July 15, 2002 – DEC 15 2002

UNIVERSITY OF MIAMI
RSMAS/MPO

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CONTENTS

A. PERSONNEL

Personnel supported for the second half of 2002 include:

R. Evans (Jul., Aug., Sept., Oct., Nov., Dec.)
V. Halliwell (Sept., Oct, Nov., Dec.)
K. Kilpatrick (Jul., Aug., Sept., Oct., Nov., Dec)
J. Splain (Jul., Aug., Sept., Oct., Nov., Dec)
S. Walsh (Jul., Aug., Sept., Oct., Nov., Dec)
R. Kolaczynski (Jul., Aug.)
D. Wilson-Diaz (Jul., Aug., Sept., Oct., Nov., Dec)
J. Brown (Jul., Aug., Sept., Oct., Nov., Dec)
E. Kearns (Jul., Aug., Sept., Oct., Nov., Dec)

B. OVERVIEW OF RECENT PROGRESS

B.1 Processing and Algorithm Development

Ocean color

TERRA

MCST delivered new Level-1b v4.09 LUT's during this reporting period Each new MSCT delivery requires Oceans to completely revaluate correction and calibration tables. Preliminary analysis showed the v4.09 L1b LUT to be an improvement to previous versions. Much of the time tends and RVS problems present in the v3 LUT are reduced in this new V4 table. This table was therefore put into operational forward stream production beginning on data day November 1,2002. Oceans developed new calibration (oceans V4.4) and correction factors for this version of the l1b . In addition to the necessary on-orbit calibration, the data from Terra-MODIS have exhibited several instrument artifacts that must be minimized in order to preserve the fidelity of the geophysical fields in the visible bands' imagery. These artifacts have included striping resulting from differences in the inter-detector response among the 10 detectors for each band, banding from the difference in reflectivity of each side of the rotating scan mirror, and cross-swatch gradients as a result of a variable response versus scan angle (RVS). The RVS and mirror-side difference corrections were estimated by computing the average cross-scan behavior for each band, relative to a central pixel, in the Hawaii imagery.

Time series analysis of the Oceans reprocessed stream (v4.3) based on Level 1b V3, and same day SeaWiFS retrievals confirmed the MCST finding that predicted v3 level1b m1 calibration coefficients began to significantly deviate from measured vales beginning around October 2002. To facilitate a consistent time series, Oceans data between September-December 2002 would benefit from a reprocessed using Level1b 4.09 and the associated new Oceans LUT. The Oceans teams would like to piggy back on the upcoming land reprocessing based on V4.09 for this data period.

AQUA

Since Aqua launch in June, efforts have begun to characterize and calibrate the visible bands of the Aqua-MODIS instrument. Of primary use in these efforts are the in situ radiances measured at the Marine Optical Buoy (MOBY) and the radiances measured by its sister instrument, Terra-MODIS.

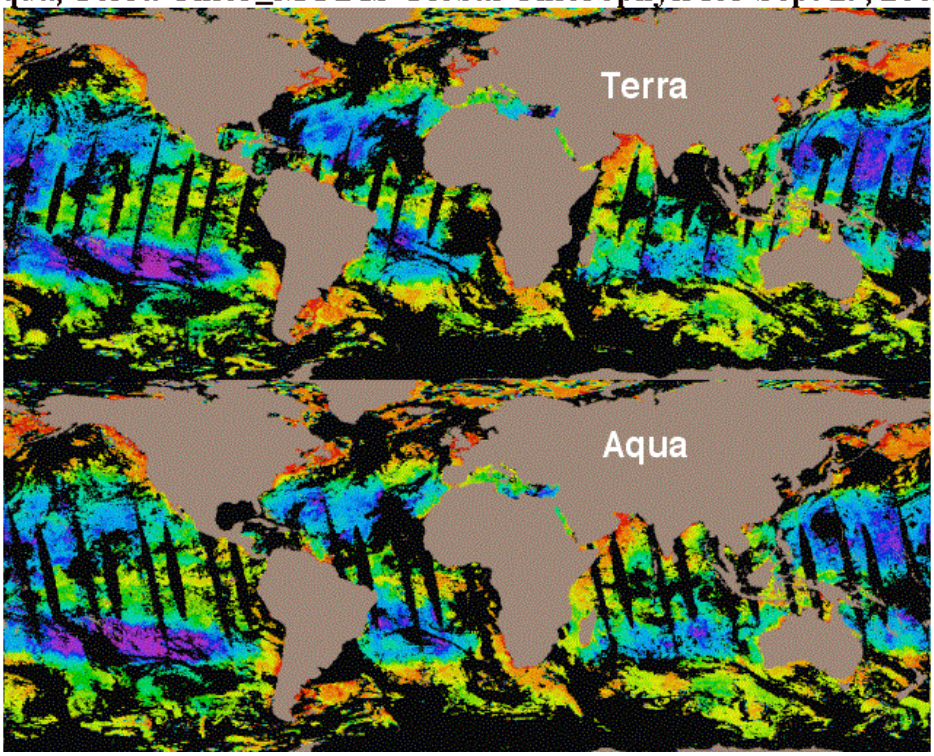
On-orbit calibration for the visible bands for Terra-MODIS has been achieved through 2 combined approaches. The MODIS Characterization and Support Team (MCST) has used data collected from an on-board screened solar diffuser to adjust the gains for each visible band to achieve calibration in total radiance (Lt). However, this method has proven to be insufficient to calibrate the ocean water-leaving radiances (Lw) to the accuracy desired by ocean scientists (typically about

Lt accuracy order 0.1%). Therefore, a second set of calibrations were performed using the time series of MOBY Lw values for the 412nm to 551nm range.

Using a time series of Aqua-MODIS data over the MOBY site (Hawaii), preliminary absolute calibrations for each band were derived. Though quality single pixel MODIS v. MOBY matchups were lacking in number due mostly to persistent summer clouds, a modal analysis of MODIS data within a 5ox5o box around the MOBY site provide a sufficient number of MODIS/mode v. MOBY/point comparisons. Using these comparisons, the absolute calibrations for each band were adjusted so that the remaining bias for each band relative to MOBY was removed. This provisional calibration and revised AQUA code was delivered to the DAAC for integration into operations. While this calibration is considered provisional due to the small number and short time series of available matchups, comparisons to same day TERRA retrievals (Figure 1) and experimental merged AQUA and TERRA products (Figure 3) appear very promising. The combined Aqua and Terra MODIS images for Sep 29 , 2002 demonstrates both the proximity of the preliminary calibration for Aqua to the Terra calibration as well as the significant coverage of the globe's surface that can be achieved in just a single day of dual MODIS coverage, persistent clouds not withstanding. Provisional AQUA ocean color products were made available to the public beginning in late December. We continue to monitor and refine the AQUA calibration as additional high quality MOBY matchups are collected and the l1b calibration is adjusted.

Figure 1 Same day AQUA and TERRA V4.4

Aqua, Terra Chlor_MODIS Global Chlorophyll for Sept 29, 2002



Sea surface temperature

MODIS Oceans SST group developed improved SST retrieval equations and coefficients for AQUA and Terra MODIS instruments. The validation status of the sea surface temperature codeV4.5 is as follows:

- Terra (provisional->valid) mid-wave 4um sst (SST4)
- Terra (valid->improved valid) thermal 10-11um SST
- Aqua (beta->valid) mid-wave 4um sst (SST4)
- Aqua (beta->valid) thermal 10-11um SST

The mid IR SST4 product had been designated a provisional products in earlier versions due to the fact that comparisons to other Satellite SST products (e.g.. Validated MODIS far IR and AVHRR Pathfinder SST) demonstrated a very large cold bias on the order of ~ 0.6 degrees. Furthermore, residuals indicated strong trends as a function of satellite zenith angle and latitudinal band as a function of season. The addition of a satellite zenith angle term to the SST4 algorithm and subsequent re-estimation of coefficients eliminated the previous bias and trends. The V4.5 changes enabled the SST4 product to move from Provisional to Validated status. The new SST4 formulation is:

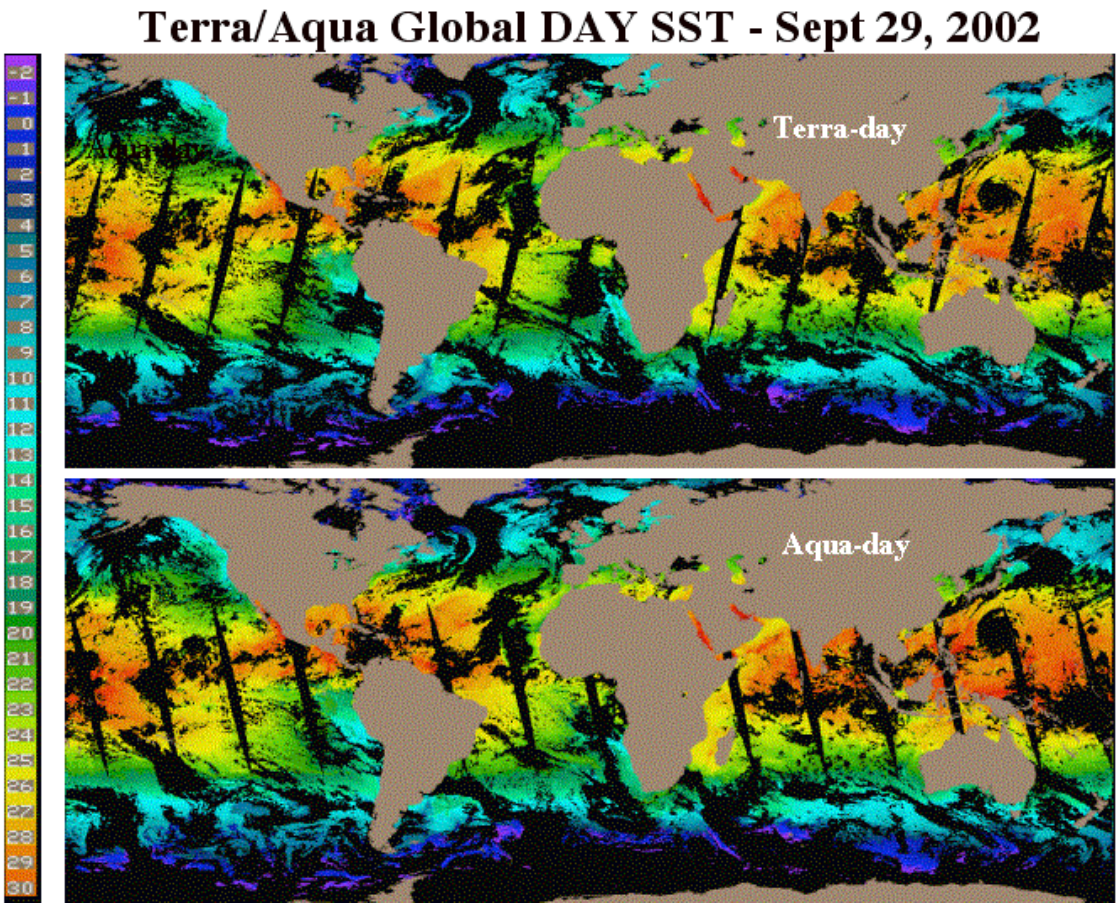
SST4 = a + b * BT22 + c * BT22-BT23 + d * (sec(theta) - 1)

Where:
BT = channel brightness temperature
Theta = satellite zenith angle

a,b,c,d = algorithm coefficients derived from the matchups database.

While the far IR SST product had been declared validated beginning with Oceans v3.4, algorithm coefficients and bias adjustments in these earlier versions were determined by regression against AVHRR Pathfinder SSTs. The preferred method for coefficient estimation is to use as a large high quality in situ matchup database (MDB) which until recently not been available due to time delays in collection of quality controlled in situ buoy measurements. Now that a sufficiently large MDB has been assembled at the University of Miami SCF the revised V4.5 coefficients estimated using the MDB provide a more accurate product with improved bias characterization and ~10% reduction in the RMS. Same day retrievals from AQUA and TERRA are shown in Figure 2 for comparison. Complete Matchups and validation statistics are presented in section B2.

Figure 2 TERRA and AQUA v4.5 SST global products processed at the Miami SCF demonstrate the consistency between two sensors



Merged AQUA -TERRA Products

Simple experimental binning algorithms were developed for prototype merged AQUA TERRA and other sensors. Preliminary results are very promising and demonstrate nearly complete global coverage (exclusive of persistent clouds). Figure 3 show an example image of merge AQUA and TERRA SST and Chlorophyll for September 29,2002. These and other fields were exchanged with with F. Wentz and C. Gentemann, AMSR Team, and the individual fields were used to develop a prototype combined IR, Microwave SST field shown in Figure 4.

Figure 3 experimental merged AQUA and TERRA products

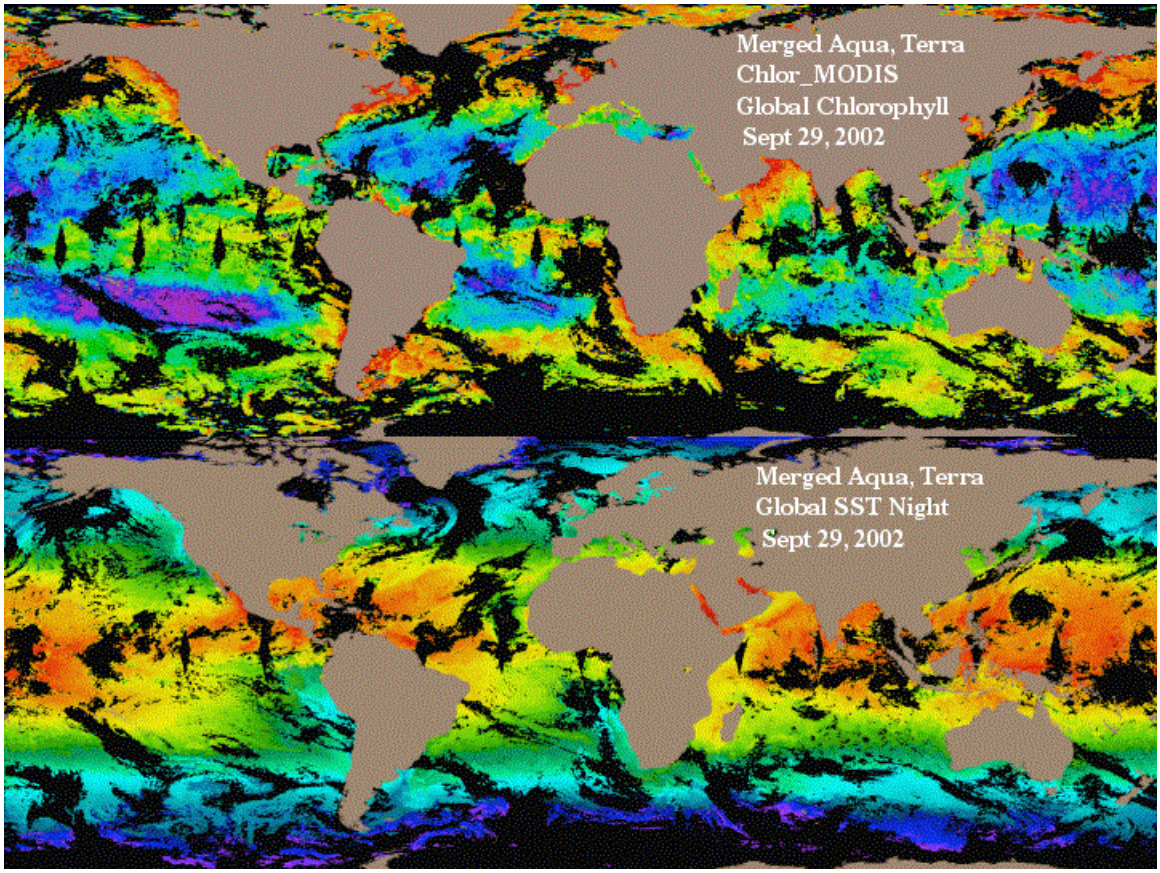
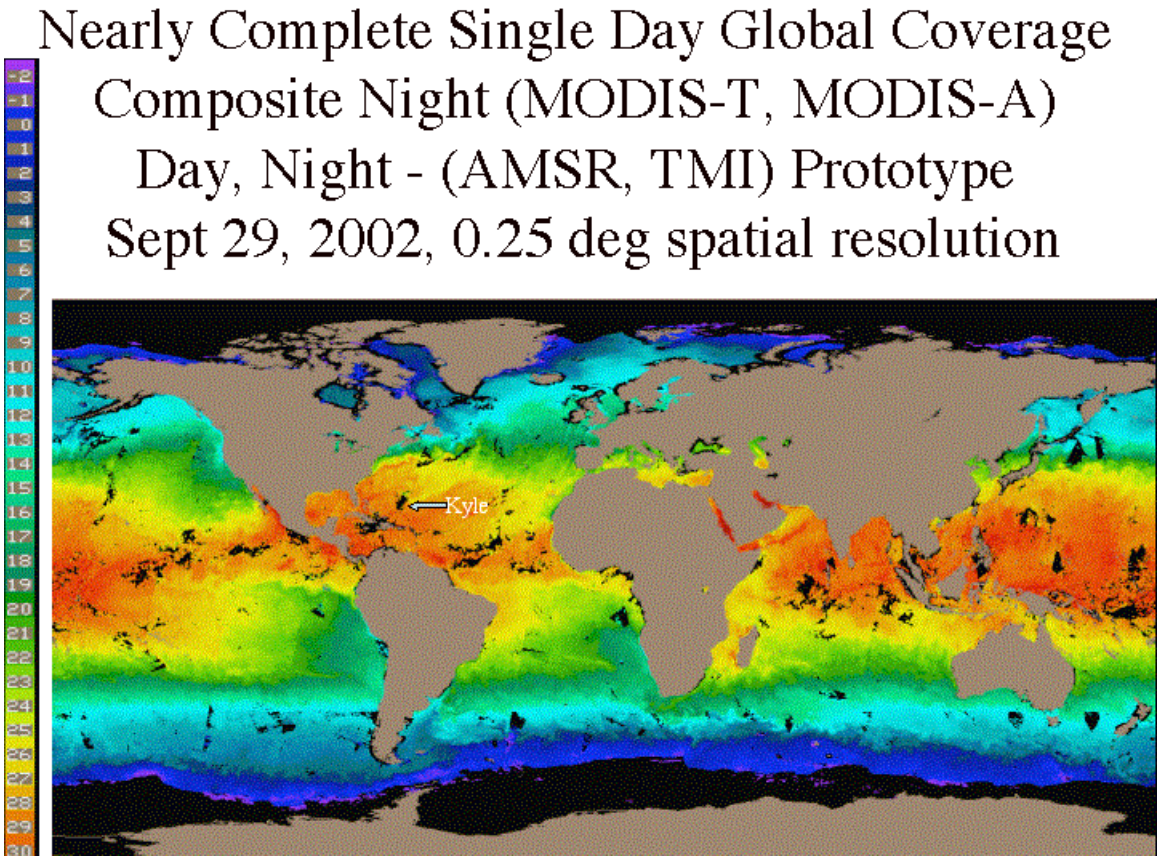


Figure 4 multi sensor merged SST prototype

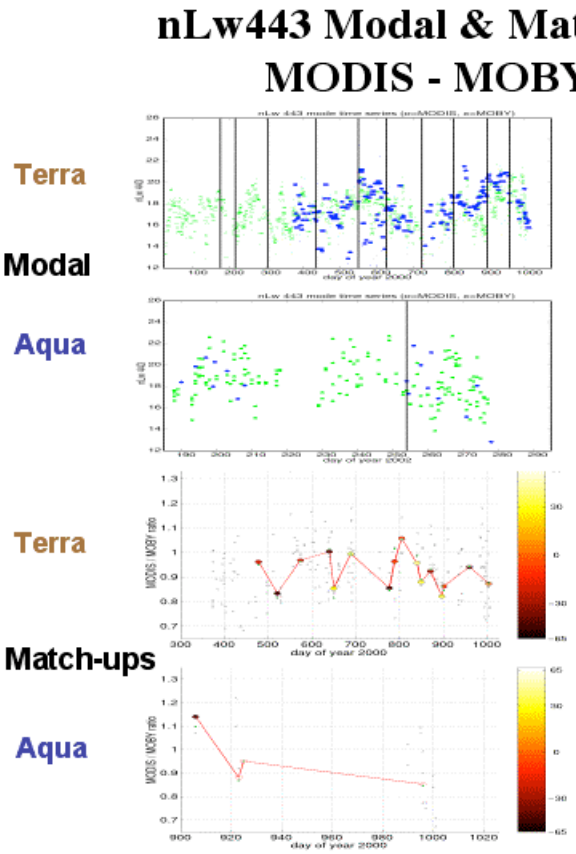


B2. Matchup databases and Validation activities

Ocean color

MODIS TERRA and AQUA MODAL and MOBY matchups statistic time series for nlw 443 are shown in figure 5 . Modal analysis using granules over the Hawaii validation site were used to compute calibration time and cross scan correction factors, the MOBY Matchups are then used to compute bias corrections.

Figure 5 MOBY matchups and Validation anlaysis



Matchup Statistics - MODIS - MOBY residuals by wavelength

Wave-length	Terra		Aqua	
	Bias	Std. Dev.	Bias	Std. Dev.
412	0.915	0.115	0.974	0.199
443	0.922	0.069	0.956	0.129
488	0.948	0.051	0.973	0.092
531	0.927	0.103	1.033	0.093
551	0.921	0.105	1.023	0.101

Top Left - Modal Plots of MODIS and MOBY L_w *vs* time used to compute time corrections

Bottom Left - MODIS/MOBY point matchups, used to compute bias corrections

MODIS SST matchups

MODIS SST Buoy and MAERI retrieval statistics for version 4.5 are shown in Table 1 and 2. Brightness temperatures in the MDB were regressed against in situ buoy bulk temperatures to determine the SST and SST4 algorithm retrieval coefficients. Maeri Explorer cruise track matchups were then used to adjust the bias term to a skin temperature reference.

Table 1. Buoy bulk temperature Matchups statistics AQUA and TERRA. median = satellite - reference

Buoy Matchups	**SST median**	**SST STD**	**SST N**	**SST4 median**	**SST4 STD**	**SST4 N**
Terra all	-0.07	0.48	11027	-	-	-
Terra night	0.01	0.42	4387	-0.05	0.41	4096
Terra Day	-0.14	0.51	6643	-	-	-
Buoy Matchups	**SST median**	**SST STD**	**SST N**	**SST4 median**	**SST4 STD**	**SST4 N**
AQUA all	-0.05	0.48	3821	-	-	-
AQUA night	-0.1	0.43	1628			
AQUA day	-0.01	0.51	2203	-	-	-

Table 2. Maeri skin temperature Matchups statistic AQUA and TERRA. median = satellite - reference

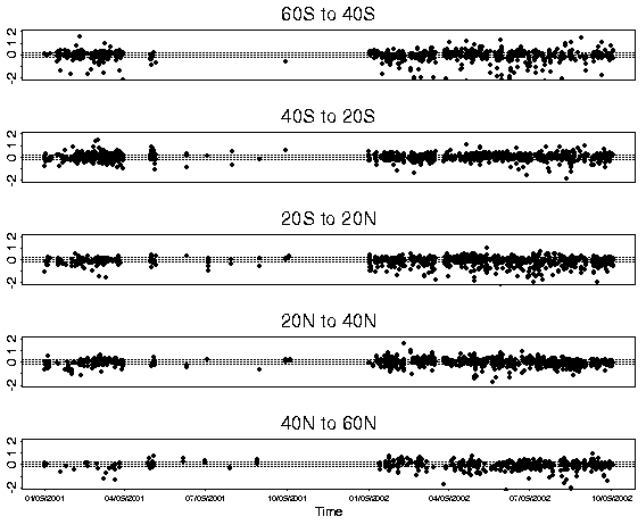
Maeri Matchups	**SST median**	**SST STD**	**SST N**	**SST4 median**	**SST4 STD**	**SST4 N**
Terra all	0.10	0.40	439	-	-	-
Terra night	0.04	0.35	235	0.02	0.34	278
Terra Day	0.16	0.42	204	-	-	-
AQUA all	0.06	0.40	105	-	-	-
AQUA night	0.02	0.37	59	-0.1	0.31	52
AQUA day	0.11	0.45	46	-	-	-

Both SST and SST4 products reprocessed at Miami using the new V4.5 coefficients and algorithms show no trends with time , satellite zenith angle (not shown) or latitude *vs* drifting and fixed buoys (Terra Figure 6 & AQUA 7).

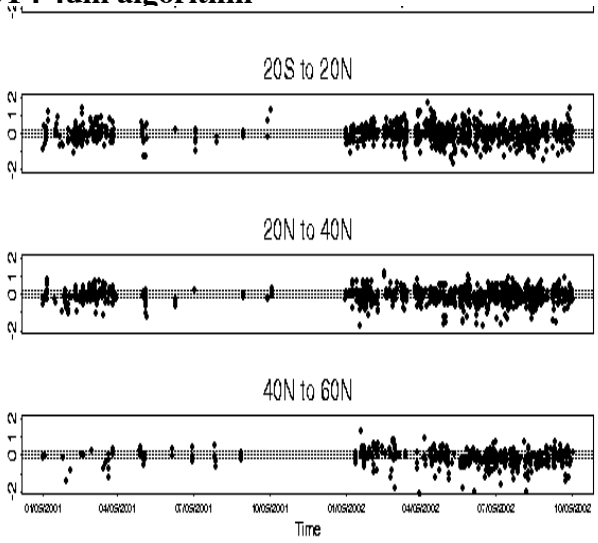
Figure 6 V4.5 Buoy matchup database time series by latitude band.
Top panels Terra, bottom panels AQUA. Dotted lines are ± 0.2K and enclose 50% of the retrievals.

Terra

SST 10-11um algorithm

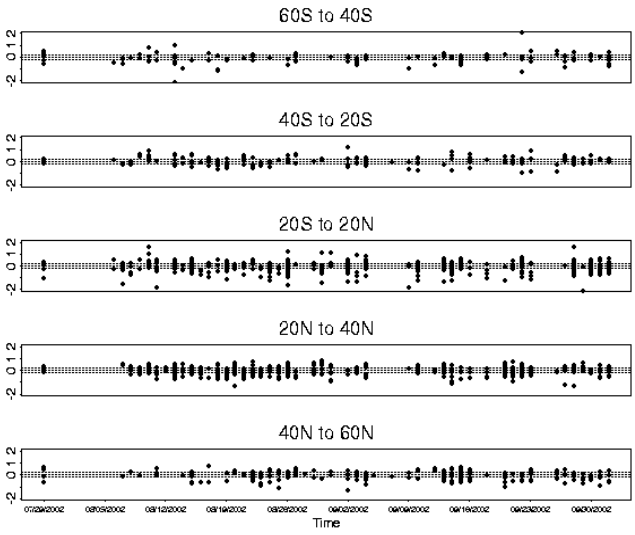


SST4 4um algorithm

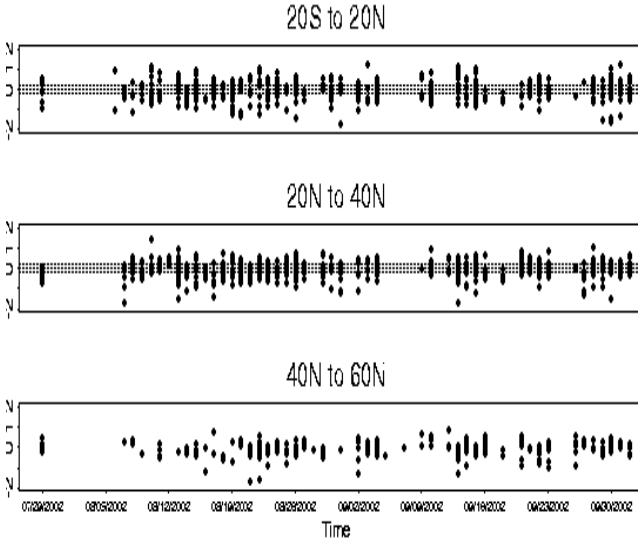


AQUA

SST 10-11um algorithm



SST4 4um algorithm



B3. Direct Broadcast and Miracle Web site

Direct broad cast
The Miami level 2 direct broad cast web page was expanded to included data from both AQUA and Terra Sensors.

Miracle web site

The miracle web site (http: miracle.rsmas.miami.edu/modis) provides a framework for sharing data and includes on-demand image generation for all types of MODIS Ocean data products to support the Oceans team activities. During this reporting period enhancements to the site where made to allow access to all l1a data (both on disk and in the tape archive). MOD01SS data now may be requested and obtained by FTP push via a web based GUI interface based on time and location. Also during this period, the level 2 image generation tools and pages were improved based on user feed back and now include improved navigation and a graphical representation of the granule location to aid in the selection of level 2 granules.

Data Processing systems
During this reporting period we added the concept of a 'standing order' in our data processing system. This feature allows us to initiate processing automatically for granules matching specific criteria (sensor, time, location). Software was developed to examine each incoming granule and execute a task (script or program) associated with a standing order if the granule meets the criteria of the standing order. The tasks can be used to simply collect certain granules or to initiate L1 (PGE02) and L2 (PGE09/PGE10) processing automatically at the Miami SCF.

B.4 Systems Support

Specifics of delivered code changes
Problems addressed V4.4:
1. New Level TERRA 1b V4.0.5 LUT and post launch AQUA
2. Minor level-3 linux/irix differences
3. Change in input files Reynolds SST and TOVS/TOMS ozone,
4. Different units for rsr Aqua vs Terra,
5. TERRA AQUA SST coefficients switch points different
6. Problem in AQUA dataday boundary due to change in ephermis files

Description of change V4.4:
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6. Problem in AQUA dataday boundary due to change in ephermis files

Problems addressed v4.5
1. The MODIS TERRA and AQUA mid-IR (4um) SST4 algorithm had not been functioning properly since launch and has been classified as provisional and not to be used for scientific studies.

2. Algorithm Coefficients for the SST 11-12um far IR seasurface temperature algorithm had previously been determined by regression analysis against the AVHRR Pathfinder SST product The prefered method is to use a large insitu matchup database for coefficient estimation.

Description of change V4.5:
1. The formulation of the SST4 algorithm was changed to include a satellite zenith angle term. This required that 1 line of code be changed.in the top level PGE10 MOD_PR_28.f90

2. New algorithm coefficients were determined for both the SST and SST4 algorithms from analysis of MODIS AQUA and TERRA Matchup databases. These coefficients are present in PGE 10 LUTs.
TERRA: mod_sst_8.coeff, mod_sst4_13.coeff
AQUA: mod_sst_aqua_sst_5.coeff, modsst_aqua_sst4_2.coeff

Code revision history for all modules for the period July 15-dec15th is listed below.

<u>New utilities:</u>
ml3m2mia: New program to convert modis maps to dsp images.

readpol-mod: New program to read, correct, and reformat the instrument polarization data supplied by MCST

<u>Problems fixed:</u>

All source files:
Update copyright notices copyright notices in Miami heritage routines

modcol:
Add check to tell Aqua data from Terra data.
Add 'Platform' check to tell Aqua data from Terra data. Add debugs.
Start to add new cross scan correction.
Correct initialization of interpolation routine.
Remove unused variables.
Fix default/error values for calcite and cocco's.
Pass platform info to coloop.
Return status of open, not other toolkit calls.
Add ability to read new, v2, unformatted Reynolds oi files.
Add check for geolocation flag 'pixels off earth'.

Fix new cross scan correction code which is still ifdef'd out.
Remove check for geo flag 'No valid terrain height'.
Don't set nLw's to -1 if a negative number was calculated (keep the negative value for SeaWiFS comparison).
Echo actual file name instead of 'ipar_prms.dat'.
Change some debugs.
Echo RESTRICT* inputs in metadata.
Avoid overflow by prechecking exponent.
New revision of coccolith routine.

modsst:
Change defaults for temp's to biaso instead of 0.0.
Fix rsr units if necessary.
Add new keywords DTSWITCH and DTWINDOW to Processing Log attribute.
Add new keywords DTSWITCH and DTWINDOW for sst coeff's switch point.
Start to add new cross scan correction.
Add Platform check for aqua or terra.
Fix use of dtswitch and dtwindow.
Add ability to read new unformatted Reynolds oi files.
Add check for geolocation flag 'pixels off earth'.
Remove check for geo flag 'No valid terrain height'. Change some comments.
Fix check for rho_wn_max to only set glint/cloudy flag if
value is positive and greater than limit.
Put Chan26 back in the Q2 file, bsst was just for debugging.
Make diff in satz term in sst4 equation optional.
Change 'open file' messages to include filenames from the pcf.
Remove diff in satz term in sst4 equation.

msbin:
Only bin color products if at least one count, i.e. greater than half the slope. Add some debugs.
Fix calculation of seconds of day.
Add option to exit with an error if the eph files aren't available.
Fix aqua night/descending dataday.

mtbin:
Yearly ('Y') files should list month or weeks (whichever is used to make the year) in INPUTPOINTER, not days.
Fix check for end of file for case where last pixel on last line is valid.

mspc:
Add ability to space down to quarter degree.

mmap:
Fix equation in calibration structure.
Fix check for successful open of the input file.

mcolshr8:
Adjust Terra tables for Aqua.
Echo actual file names from pcf.

msstshr5:
Echo actual file names from pcf.

atmcorshr:
Add ability to read new Reynolds V2 unformatted oi files.
Start to change radcor format.
Echo filenames from pcf file.

binshr:
Fix length of array used for input pointer file names.

ml3m2mia:
Convert modis maps to dsp.

mocean:
Fix read for map (grid) file types.

anc:
Correct header error in TOVS data file -- end milliseconds is incorrect,it is given as 230000Z instead of 235959Z.

modisio:
Max. number of input files should be 400 to allow for days in a year.
Change 'missing cloud mask' message to look less like a failure since it's just a warning.

mextract:
Handle both Aqua and Terra.
Various other updates and fixes.
Distinguish Terra and Aqua records using SAT environment variable.
Display records processed versus records read.
Add more tests for Terra vs Aqua.
Clean up variable naming.

modinc:
ocean_lun.*: Add OC_OPTMODEL_LUN, OC_MATMODEL_LUN, and REY_WK_UNF_LUN.

readpol-mod:
Suppress error message.
Add new main program.

B.5 Team Interactions

Participated in weekly teleconferences with MCST, PIP , and Oceans science team. Workshop meetings we help between Miami SCF personnel and the SeaWiFS project office in September of 2002 to discuss current status of the MODIS code and joint validation activities. A 2 day working meeting was held in Dec 2002 between the Miami SCF personnel and the MODIS MCST group to discuss oceans current calibration findings and develop a joint strategy for rapid calibration response changes on TERRA.

Publications and presentations given at meetings, symposia, and workshops in the last half of 2002 are listed below:

Presentations

Sea surface temperature measured by the *MOD*erate resolution *I*maging *S*pectroradiometer (MODIS). R. H. Evans, E. J. Kearns, P. J. Minnett, O. Brown, Warner Baringer, Jim Brown, Kay Kilpatrick, Sue Walsh MODIS Team Meeting, July 23, 2002

MODIS Remote Sensing of Sea Surface Temperature, Invited Lecture, Robert Evans, University of Miami L'Aquila Italy, Workshop, Remote Sensing of the Earth's Environment from Terra, August 25-30, 2002.

Current state and future directions for absolute accuracy, and long-term stability of [MODIS-like] visible and near IR sensors, R Evans Invited, Workshop on Satellite Instrument Calibration for Measureing Global Climate Change, University of Maryland, Nov 12-14, 2002

Sea surface temperature measured by the *MOD*erate resolution *I*maging *S*pectroradiometer (MODIS). O. B. Brown, R. H. Evans, P. J. Minnett, E. J. Kearns, Kay Kilpatrick, NASA Investigator Working Group, Nov 18, 2002, Maryland

Early Results from Aqua-MODIS, Kearns, E. Evans R. Kilpatrick, K, poster Ocean Optics XVI,Sante Fe New Mexico, Nov 19-22.

Application of the Specgtral Matching Algorithm to the Arabian Sea SeaWiFS Imagery,
Banzon, P; Evans, R; Gordon, H; Chomko, R; poster, Ocean Optics XVI,Sante Fe New Mexico, Nov 19-22.

Current state and future directions for absolute accuracy, and long-term stability of [MODIS-like] visible sensors, R Evans**,** Invited, MERIS Science Advisory

Group presentation, ESRIN – European Space Research Information Network, Frascati Italy, Nov 26-27 2002

Sea surface temperature accuracy and selective applications measured by the *MOD*erate resolution *I*maging *S*pectroradiometer (MODIS). R Evans and P Minnett. GHRSST, Global High Resolution Sea Surface Temperature workshop, ESRIN, Frascati Italy, Dec 1-3, 2002

Application of MODIS SST to Mediterranean Sea Forecasting, R Evans. Instituto di Scienze dell'Atmosphera e del Clima, Rome Italy Dec 4, 2002.

Publications 2002 (including submitted and in press)

Olson, Donald B., R.H. Evans, and E. J. Kearns (2002). Surface Fronts and the Florida Strait Ecosystem. Geophysical Research Letters (In Preparation).

Retrospective processing of the CZCS archive (1979-86) as a basis for analyzing the present and forthcoming satellite ocean color observations. I : Algorithms description, sensitivity analyses and calibration considerations. D Antoine, Morel A, Gordon H, Evans R, Banzon V. Submitted to Global Biogeochemical Cycles, XX, 2002

Retrospective processing of the CZCS archive (1979-86) as a basis for analyzing the present and forthcoming satellite ocean color observations. II : Global distributions of the chlorophyll biomass and of the aerosol optical thickness and Ångstrøm exponent.
D Antoine, Morel A, Gordon H, Evans R, Banzon V. Submitted to Global Biogeochemical Cycles, XX, 2002

Anchoring a global, multi-year, multi-sensor, ocean color record : a renewed global data set of phytoplankton pigments and atmospheric aerosols from the reprocessing of the "Coastal Zone Color Scanner" observations. D Antoine, Morel A, Gentili B, Gordon H, Evans R, Banzon V. Brown J, Walsh S, Baringer W, Li A. *Submitted to EOS, Trans. AGU, December, 2002*

Ocean primary production estimates from Terra MODIS and their dependency on satellite chlorophyll *a* algorithms. Esaias W, Abbott M, Carder K, Campbell J, Clark D, Evans R, Gordon H, Brown O, Minnett P, Kearns E, Kilpatrick K, Mitchell G, Turpie K, Woodward R, Vogel R, Thomas D, Submitted to Remote Sensing of the Environment

B.6 Oceans Software release and copyright

MODIS Ocean institutional software was made publicly available on Jan 1,2003. During this reporting period the University of Miami technology transfer and legal offices held several meetings with the GSFC legal office to resolve copyright and indemnification issues in regard to MODIS oceans software

release. It was agreed that the University of Miami would retain copyright to heritage code and granted NASA an unlimited worldwide royalty free license to use. Distribute, or modify heritage modules or code integrated into the MODIS Oceans software package. The third party license agreement was also modified to specifically include an indemnification clause for the University of Miami. The exhibits below document the copyright ownership for each of modules and individuals routines that comprise the MODIS Oceans Software package..

Exhibit A Heritage code

The foundation of the MODIS ocean software is based on derivatives of heritage software not first produced under NAS5-31362 contract. Heritage work includes the following programs and associated libraries. The Software routines listed below were only slight modified to read or write MODIS io files and include minor changes to comply with EOS MODIS programming standards and guidelines (drafted 5/03/94) as it relates to marking heritage code under section 4.1.1.1 pg6. The logic and architecture of these routines are not unique to the MODIS sensor and have been or are currently used by other satellite data processing software packages developed by the University of Miami in the late 1970's and early 1980's. The Heritage routines were copyrighted in 1988 prior to the start of NASA contract NAS5-31362 in December of 1991.

Heritage Program modules:

Mcloud - Compares daily image to a 3-week reference for quality control/de-clouding
Mfill - Fill gaps in a global reference fill by interpolation and smoothing
Mmap - Map satellite data to a geographical projection.
Msbin - Aggregate granules/orbits into a global file, modified for MODIS to included mixed day/night granules
Mspc - Aggregate data to various spatial resolutions
Mtbin - Aggregate data to various time resolutions
Msstshr5 - Rayleigh and ozone corrections

Heritage Libraries**:**

displyshr library - Image file handling common area
goelib library - Geodetic-geocentric latitude transform io library - image file handling routines, some modified code to read PCF file,
rtlib library - String handling routines
satellite library - Time and date routines
sphlib library - Mapping routines
ulib library - NCAR routine to integrate over a given set of ordinates
vmsforlib library -Wrappers for some functions
atmcorshr/readreyw.rat - Modified to read other type of Reynolds reference

Modules containing a mixed Heritage and new MODIS code

MODCOL- Top level module for ocean color products processing execution group 09 (PGE09)
MODSST- Top level module for Seasurface temperature products processing execution group (PGE10)

Complete Listing of all individual heritage routines by filename:

Delivery tree directory path/ heritage source code filename

./PGE09/MOD_PR18/MOD_PR18.f90
./PGE09/MOD_PR18/MOD_PR18.mk
./PGE09/MOD_PR18/anly8dbl.f90
./PGE09/MOD_PR18/clarkio-v1.0.c
./PGE09/MOD_PR18/fresnel.f90
./PGE09/MOD_PR18/gordon_o2.f
./PGE09/MOD_PR18/gordon_absorbing.f
./PGE09/MOD_PR18/hdf-io1.f90
./PGE09/MOD_PR18/ipar-1.2.f
./PGE09/MOD_PR18/seabam_chlor.c
./PGE09/MOD_PR18/modis_chl-1.2.c
./PGE10/MOD_PR28/MOD_PR28.f90
./PGE10/MOD_PR28/MOD_PR28.mk
./PGE10/MOD_PR28/etbpsub.f90
./PGE10/MOD_PR28/get_emissivity.f90
./PGE10/MOD_PR28/mcsstop.f90
./PGE10/MOD_PR28/modsstcoeffs.f90
./shared_lib/ocean/oceanLibSrc/anc/HDFroutines.c
./shared_lib/ocean/oceanLibSrc/anc/dataintp.f
./shared_lib/ocean/oceanLibSrc/anc/getanc.c
./shared_lib/ocean/oceanLibSrc/anc/julian.f
./shared_lib/ocean/oceanLibSrc/atmcorshr/ascdscsub.f90
./shared_lib/ocean/oceanLibSrc/atmcorshr/airmass.f (part of sphlib/sunang2.f)
./shared_lib/ocean/oceanLibSrc/atmcorshr/asinn.f
./shared_lib/ocean/oceanLibSrc/atmcorshr/calprint.f90
./shared_lib/ocean/oceanLibSrc/atmcorshr/hdf-wrd.c (read i4 and c are new)
./shared_lib/ocean/oceanLibSrc/atmcorshr/gliter.f
./shared_lib/ocean/oceanLibSrc/atmcorshr/readreyw.f90
./shared_lib/ocean/oceanLibSrc/atmcorshr/removecomma.c
./shared_lib/ocean/oceanLibSrc/atmcorshr/utils.f90
./shared_lib/ocean/oceanLibSrc/atmcorshr/glitervec.f
./shared_lib/ocean/oceanLibSrc/atmcorshr/rayleigh_rough.f
./shared_lib/ocean/oceanLibSrc/binshr/bin9kmf.f90
./shared_lib/ocean/oceanLibSrc/binshr/getmask.f90
./shared_lib/ocean/oceanLibSrc/binshr/loadmask.f90

./shared_lib/ocean/oceanLibSrc/binshr/openmask.f90
./shared_lib/ocean/oceanLibSrc/binshr/parsemskflg.f90
./shared_lib/ocean/oceanLibSrc/binshr/setupl3b.f90
./shared_lib/ocean/oceanLibSrc/displyshr/dspcommons.f90
./shared_lib/ocean/oceanLibSrc/goelib/geolat.f
./shared_lib/ocean/oceanLibSrc/io/arg.c
./shared_lib/ocean/oceanLibSrc/io/forge.c
./shared_lib/ocean/oceanLibSrc/io/atof.c
./shared_lib/ocean/oceanLibSrc/io/cuttree.c
./shared_lib/ocean/oceanLibSrc/io/caleval.c
./shared_lib/ocean/oceanLibSrc/io/dsplib.c
./shared_lib/ocean/oceanLibSrc/io/errmsg.c
./shared_lib/ocean/oceanLibSrc/io/evlcal.c
./shared_lib/ocean/oceanLibSrc/io/get.c
./shared_lib/ocean/oceanLibSrc/io/init.c
./shared_lib/ocean/oceanLibSrc/io/makefile
./shared_lib/ocean/oceanLibSrc/io/parser.c
./shared_lib/ocean/oceanLibSrc/io/splitimg.c
./shared_lib/ocean/oceanLibSrc/io/utils.c
./shared_lib/ocean/oceanLibSrc/mcolshr8/caldob.f90
./shared_lib/ocean/oceanLibSrc/mcolshr8/calf0.f90
./shared_lib/ocean/oceanLibSrc/mcolshr8/callcw.f90
./shared_lib/ocean/oceanLibSrc/mcolshr8/calwhite.f90
./shared_lib/ocean/oceanLibSrc/mcolshr8/colorsub8.c
./shared_lib/ocean/oceanLibSrc/mcolshr8/get_climatology.c
./shared_lib/ocean/oceanLibSrc/mcolshr8/makefile
./shared_lib/ocean/oceanLibSrc/msstshr5/avhrrsub5.f90
./shared_lib/ocean/oceanLibSrc/msstshr5/calgetozone.f90
./shared_lib/ocean/oceanLibSrc/msstshr5/getozone.f90
./shared_lib/ocean/oceanLibSrc/msstshr5/makefile
./shared_lib/ocean/oceanLibSrc/rtlib/append.c
./shared_lib/ocean/oceanLibSrc/rtlib/ftrim.c
./shared_lib/ocean/oceanLibSrc/rtlib/indexx.c
./shared_lib/ocean/oceanLibSrc/rtlib/iscomp.c
./shared_lib/ocean/oceanLibSrc/rtlib/lenstr.c
./shared_lib/ocean/oceanLibSrc/rtlib/makefile
./shared_lib/ocean/oceanLibSrc/rtlib/merge.c
./shared_lib/ocean/oceanLibSrc/rtlib/mergeb.c
./shared_lib/ocean/oceanLibSrc/rtlib/scopy.c
./shared_lib/ocean/oceanLibSrc/rtlib/setlow.c
./shared_lib/ocean/oceanLibSrc/rtlib/setupp.c
./shared_lib/ocean/oceanLibSrc/rtlib/smove.c
./shared_lib/ocean/oceanLibSrc/rtlib/stoupper.c
./shared_lib/ocean/oceanLibSrc/satellite/brkmil.f90
./shared_lib/ocean/oceanLibSrc/satellite/grejul.f90
./shared_lib/ocean/oceanLibSrc/satellite/isleap.f90

./shared_lib/ocean/oceanLibSrc/satellite/julgre.f90
./shared_lib/ocean/oceanLibSrc/satellite/makefile
./shared_lib/ocean/oceanLibSrc/satellite/miltim.f90
./shared_lib/ocean/oceanLibSrc/satellite/miltmr.f90
./shared_lib/ocean/oceanLibSrc/satellite/tmrmil.f90
./shared_lib/ocean/oceanLibSrc/sphlib/cvtlng.f90
./shared_lib/ocean/oceanLibSrc/sphlib/cvttyphdr.f90
./shared_lib/ocean/oceanLibSrc/sphlib/ephs.f
./shared_lib/ocean/oceanLibSrc/sphlib/forward.f90
./shared_lib/ocean/oceanLibSrc/sphlib/iwindow.f90
./shared_lib/ocean/oceanLibSrc/sphlib/makefile
./shared_lib/ocean/oceanLibSrc/sphlib/mapsetup.f90
./shared_lib/ocean/oceanLibSrc/sphlib/raylei.f
./shared_lib/ocean/oceanLibSrc/sphlib/reflec.f
./shared_lib/ocean/oceanLibSrc/sphlib/reverse.f90
./shared_lib/ocean/oceanLibSrc/sphlib/sunang2.f
./shared_lib/ocean/oceanLibSrc/sphlib/winset.f90
./shared_lib/ocean/oceanLibSrc/ulib/makefile
./shared_lib/ocean/oceanLibSrc/ulib/simpsn.f
./shared_lib/ocean/oceanLibSrc/vmsforlib/cosd.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/dacosd.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/dasind.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/datan2d.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/datand.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/dcosd.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/dsind.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/dtand.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/iaddr.c
./shared_lib/ocean/oceanLibSrc/vmsforlib/makefile
./shared_lib/ocean/oceanLibSrc/vmsforlib/sind.c
./shared_src/ocean_incl/GDhdfeos.h
./shared_src/ocean_incl/SWhdfeos.h
./shared_src/ocean_incl/aerosol.h
./shared_src/ocean_incl/anc.h
./shared_src/ocean_incl/ancproto.h
./shared_src/ocean_incl/angel.h
./shared_src/ocean_incl/arg.h
./shared_src/ocean_incl/assdata.h
./shared_src/ocean_incl/audit.h
./shared_src/ocean_incl/band.h
./shared_src/ocean_incl/bindefs.h
./shared_src/ocean_incl/bytes.h
./shared_src/ocean_incl/calibration.h
./shared_src/ocean_incl/carder_lut.h
./shared_src/ocean_incl/cddef.h
./shared_src/ocean_incl/colorin1.h

./shared_src/ocean_incl/comcom.h
./shared_src/ocean_incl/comdisply.h
./shared_src/ocean_incl/copy.h
./shared_src/ocean_incl/dbmanrec.h
./shared_src/ocean_incl/dir.h
./shared_src/ocean_incl/display.h
./shared_src/ocean_incl/displycom.h
./shared_src/ocean_incl/dp-table.h
./shared_src/ocean_incl/dsp-ansi.h
./shared_src/ocean_incl/dsplib.h
./shared_src/ocean_incl/dspmsgdef.h
./shared_src/ocean_incl/fcommon.h
./shared_src/ocean_incl/fcslib.h
./shared_src/ocean_incl/field.h
./shared_src/ocean_incl/filefield.h
./shared_src/ocean_incl/flags.h
./shared_src/ocean_incl/flagscom.h
./shared_src/ocean_incl/flagshide.h
./shared_src/ocean_incl/genclnt.h
./shared_src/ocean_incl/get_climatology.h
./shared_src/ocean_incl/getcomflg.h
./shared_src/ocean_incl/hdf_io_tools.h
./shared_src/ocean_incl/idir.h
./shared_src/ocean_incl/imgdesc.h
./shared_src/ocean_incl/imgerrno.h
./shared_src/ocean_incl/imgheader.h
./shared_src/ocean_incl/imgopncom.h
./shared_src/ocean_incl/imgqual.h
./shared_src/ocean_incl/imgstdio.h
./shared_src/ocean_incl/imgtypes.h
./shared_src/ocean_incl/ingest_header.h
./shared_src/ocean_incl/inghdrczc.h
./shared_src/ocean_incl/inghdrtir.h
./shared_src/ocean_incl/message.h
./shared_src/ocean_incl/misc_header.h
./shared_src/ocean_incl/mocean.h
./shared_src/ocean_incl/moceandata.h
./shared_src/ocean_incl/mocmoc.h
./shared_src/ocean_incl/modis_smf.h
./shared_src/ocean_incl/modisio_v2.h
./shared_src/ocean_incl/navigation.h
./shared_src/ocean_incl/newnames.h
./shared_src/ocean_incl/pal.h
./shared_src/ocean_incl/palette.h
./shared_src/ocean_incl/parser.h
./shared_src/ocean_incl/projvars.h

./shared_src/ocean_incl/rawcal.h
./shared_src/ocean_incl/rpc-types.h
./shared_src/ocean_incl/rpc.h
./shared_src/ocean_incl/rtlib.h
./shared_src/ocean_incl/runcal.h
./shared_src/ocean_incl/satcalpar.h
./shared_src/ocean_incl/scan_cache.h
./shared_src/ocean_incl/shpsphcom.h
./shared_src/ocean_incl/table.h
./shared_src/ocean_incl/types.h
./shared_src/ocean_incl/v2_meta.h
./shared_src/ocean_incl/vfont.h
./shared_src/ocean_incl/wrkfun.h
./shared_src/ocean_incl/wrkspc.h
./shared_src/ocean_incl/xdr.h
./shared_src/ocean_incl/xfb.h
./shared_src/ocean_incl/hoge-v3.0.h
./shared_src/ocean_incl/hogemods-v3.0.h
./shared_src/ocean_src/mcloud/MOD_PRmcloud.f90
./shared_src/ocean_src/mcloud/MOD_PRmcloud.mk0
./shared_src/ocean_src/mfill/MOD_PRmfill.f90
./shared_src/ocean_src/mfill/MOD_PRmfill.mk0
./shared_src/ocean_src/mfill/nan.c
./shared_src/ocean_src/mfill/getmaskb.f90
./shared_src/ocean_src/mmap/MOD_PRmmap.f90
./shared_src/ocean_src/mmap/MOD_PRmmap.mk0
./shared_src/ocean_src/mmap/czcssubn.f90
./shared_src/ocean_src/mmap/remapgrid.f90
./shared_src/ocean_src/mmap/remapit.f90
./shared_src/ocean_src/msbin/MOD_PRmsbin.f90
./shared_src/ocean_src/msbin/MOD_PRmsbin.mk0
./shared_src/ocean_src/msbin/binit.f90
./shared_src/ocean_src/msbin/geo_distort.f90 (algorithm change)
./shared_src/ocean_src/msbin/setupflags.f90
./shared_src/ocean_src/mspc/MOD_PRmspc.f90
./shared_src/ocean_src/mspc/MOD_PRmspc.mk0
./shared_src/ocean_src/mspc/binitspc.f90
./shared_src/ocean_src/mtbin/MOD_PRmtbin.f90
./shared_src/ocean_src/mtbin/MOD_PRmtbin.mk0
./shared_src/ocean_src/mtbin/missiondays.f90

Exhibit B MODIS Oceans Software

The MODIS Oceans Software has been developed to process MODIS Level 1b satellite data and retrieve geo-physically important measurements of the world 's ocean. The software programs were integrated at the University of Miami and

delivered under contract to NASA. Programs have been coded using C and Fortran 90 using EOS toolkit support routines and HDF-EOS file structures. There are two central Level-2 processing routines, one for sea-surface temperature (MODSST) and another for ocean color (MODCOL). Algorithms have been integrated from O. Brown for (SST), H. Gordon for atmospheric correction, K. Carder for chlorophyll and other Case II water products, M. Abbott for Fluorescence Line Height and Chlorophyll Fluorescence Efficiency, F. Hoge for Phycourobilin and Phycoerythrobilin, D. Clark for various Case I water properties; Suspended solids, K490, Chlorophyll pigments, and H. Gordon and Wm. Balch for Coccolithphore concentrations. Level -3 binning programs (Mtbin,Mspc,Mfill) have been developed from heritage algorithms and source code to generate global files for each of the ocean products from high resolution level-2 files. These files can be binned into desired space and time resolutions required to meet both EOS standard and investigator specific resolutions. Finally a mapping program (Mmap) is available to produce gridded products.

The heritage programs developed at the University of Miami provided the basis for MODIS Oceans software framework (see Exhibit A). A program developed for the Pathfinder ocean AVHRR SST product forms the framework for the MODSST module. The color algorithms are based on experience gained in transition from CZCS to SeaWiFS algorithms. The SeaWiFS and Pathfinder AVHRR programs were directly converted to the MODIS implementations and coded using the FORTRAN 90 language and EOS coding standards, MODIS unique algorithms provided by members of the MODIS Ocean team were then added to this framework. In addition MODIS sensor unique coefficient and look up tables (LUT's) were developed and integrated in to the processing frame work. A complete listing of MODIS unique source code and LUT's is given below. A file listing of heritage code is given in exhibit A.

<u>Source code unique to the MODIS ocean software, first developed under contract:</u>

listed by filename

./PGE09/MOD_PR18/hdf-io1b.f90
./PGE09/MOD_PR18/coccolith.f
./PGE09/MOD_PR18/cweps-1.2.f
…./PGE09/MOD_PR18/getcolpar.f90
./PGE09/MOD_PR18/hdf-io3.c
./PGE09/MOD_PR18/parseeqn.f90
./PGE09/MOD_PR18/hoge-v2.2.c
./PGE09/MOD_PR18/hogeio-v2.2.c
./PGE09/MOD_PR18/hogemods-v2.2.c
./PGE09/MOD_PR18/new_modis_pol_corr_sub.f
./PGE09/MOD_PR18/parsebool.f90
./PGE09/MOD_PR18/parsearray.f90

./PGE09/MOD_PR18/readndt.f
./PGE09/MOD_PR18/secnds.f90
./PGE09/MOD_PR18/setcolmeta.f90
./PGE09/MOD_PR18/setcolqual.f90
./PGE09/MOD_PR18/wang3.f
./PGE09/MOD_PR18/hdf-iosst.c
./PGE10/MOD_PR28/fakeetbp.f90
./PGE10/MOD_PR28/getsstpar.f90
./PGE10/MOD_PR28/hdf-io.c
./PGE10/MOD_PR28/mcsstop.f90
./PGE10/MOD_PR28/setsstmeta.f90
./PGE10/MOD_PR28/setsstqual.f90
./PGE10/MOD_PR28/setuplog.f90
./PGE10/MOD_PR28/wang3sub.f
./shared_lib/ocean/oceanLibSrc/Mwrap/ccalloc.c
./shared_lib/ocean/oceanLibSrc/Mwrap/ffree.c
./shared_lib/ocean/oceanLibSrc/Mwrap/makefile
./shared_lib/ocean/oceanLibSrc/Mwrap/mmalloc.c
./shared_lib/ocean/oceanLibSrc/Mwrap/mmemcpy.c
./shared_lib/ocean/oceanLibSrc/Mwrap/rrealloc.c
./shared_lib/ocean/oceanLibSrc/anc/makefile
. /shared_lib/ocean/oceanLibSrc/atmcorshr/acoss.f
./shared_lib/ocean/oceanLibSrc/atmcorshr/ascdscsub.f90
./shared_lib/ocean/oceanLibSrc/atmcorshr/makefile
./shared_lib/ocean/oceanLibSrc/atmcorshr/msgetcal.c
./shared_lib/ocean/oceanLibSrc/atmcorshr/parsereals.f90
./shared_lib/ocean/oceanLibSrc/atmcorshr/getcorrections.f90
./shared_lib/ocean/oceanLibSrc/atmcorshr/hdf_io_tools.c
./shared_lib/ocean/oceanLibSrc/binshr/appendproclog.f90
./shared_lib/ocean/oceanLibSrc/binshr/settbinmeta.f90
. /shared_lib/ocean/oceanLibSrc/binshr/bin9kmf.f90
./shared_lib/ocean/oceanLibSrc/binshr/convertkwd.f90
./shared_lib/ocean/oceanLibSrc/binshr/fixuplong.c
./shared_lib/ocean/oceanLibSrc/binshr/fixupshort.c
./shared_lib/ocean/oceanLibSrc/binshr/l3in.c
./shared_lib/ocean/oceanLibSrc/binshr/l3out.f90
./shared_lib/ocean/oceanLibSrc/binshr/len_str.f
./shared_lib/ocean/oceanLibSrc/binshr/makefile
./shared_lib/ocean/oceanLibSrc/binshr/maketime.f90
./shared_lib/ocean/oceanLibSrc/binshr/pgs-util.c
./shared_lib/ocean/oceanLibSrc/binshr/pgsmetwrap.c
./shared_lib/ocean/oceanLibSrc/binshr/stripandappend.f90
./shared_lib/ocean/oceanLibSrc/binshr/timestamp.f90
./shared_lib/ocean/oceanLibSrc/binshr/writecal.c
./shared_lib/ocean/oceanLibSrc/displyshr/makefile
./shared_lib/ocean/oceanLibSrc/goelib/makefile

./shared_lib/ocean/oceanLibSrc/mocean/makefile
./shared_lib/ocean/oceanLibSrc/mocean/moceancal.c
./shared_lib/ocean/oceanLibSrc/mocean/moceanclose.c
./shared_lib/ocean/oceanLibSrc/mocean/moceancreate.c
./shared_lib/ocean/oceanLibSrc/mocean/moceangeoloc.c
./shared_lib/ocean/oceanLibSrc/mocean/moceanopen.c
./shared_lib/ocean/oceanLibSrc/mocean/moceanread.c
./shared_lib/ocean/oceanLibSrc/mocean/moceanutil.c
./shared_lib/ocean/oceanLibSrc/mocean/moceanwrite.c
./shared_lib/ocean/oceanLibSrc/modisio/L1B_Geo_Cld_Interface.c
./shared_lib/ocean/oceanLibSrc/modisio/Geo_Interface.c

./shared_lib/ocean/oceanLibSrc/modisio/OCEANS_SMF_GenerateStatusReport.c
./shared_lib/ocean/oceanLibSrc/modisio/OCEANS_SMF_SetDynamicMsg.c
./shared_lib/ocean/oceanLibSrc/modisio/makefile
./shared_lib/ocean/oceanLibSrc/modisio/mod_get_l1b_attr_v2.c
./shared_lib/ocean/oceanLibSrc/modisio/v2_meta.c
./shared_src/ocean_incl/commoninout.h
./shared_src/ocean_incl/mwrap.h
./shared_src/ocean_incl/mwrap_1.h
./shared_src/ocean_incl/ocean_lun.f
./shared_src/ocean_incl/ocean_lun.h
./shared_src/ocean_src/mcloud/setuplogmsc.f90
./shared_src/ocean_src/mfill/setuplogmfill.f90
./shared_src/ocean_src/mfill/secnds.f90
./shared_src/ocean_src/mmap/hdf-io1.f90
./shared_src/ocean_src/mmap/setuplogmmap.f90
./shared_src/ocean_src/msbin/dayboundsub.f90
./shared_src/ocean_src/msbin/hdf-iom.c
./shared_src/ocean_src/msbin/getqual.f90
./shared_src/ocean_src/msbin/hdf-io1.f90
./shared_src/ocean_src/msbin/dayboundsubfake.f90
./shared_src/ocean_src/msbin/makestarttime.f90
./shared_src/ocean_src/msbin/setsbinmeta.f90
./shared_src/ocean_src/msbin/setuplog.f90
./shared_src/ocean_src/msbin/stdtime.f90
./shared_src/ocean_src/mspc/setuplog.f90
./shared_src/ocean_src/mtbin/setuplog.f90

MODIS input files and coefficients first developed under contract.

Data values and coefficients contained within these files are required by the MODIS Oceans Software and are unique to the MODIS sensor

MODCOL PGE09 inputs:

carder_params8.dat.coeff
clark_params6.dat.coeff
coast_h50_v00_s00_d35_3.hdf
coast_h70_v00_s00_d35_3.hdf
coast_h90_v00_s00_d35_3.hdf
coast_h99_v00_s00_d35_3.hdf
coccolith_tables.dat.coeff*
global_ndt4.hdf
hoge_params2.dat.coeff*
ipar_prms.dat.coeff*
marit_h50_v00_s00_d35_3.hdf
marit_h70_v00_s00_d35_3.hdf
marit_h90_v00_s00_d35_3.hdf
marit_h99_v00_s00_d35_3.hdf
modcol_aqua_params23.dat.coeff
modcol_params23.dat.coeff
modisSW_afrid_h06_v00_s00_d35_3.hdf
modisSW_asiad_h02_v00_s00_d35_3.hdf
modis_radcor_aqua_nocorr.col.hdf
modis_radcor_terra_v13_43.col.hdf
modis_radcor_terra_v14_22.col.hdf
modis_radcor_v12_56.col.hdf
modisdob.cal.coeff*
modisdob2.cal.coeff
modisdob3_aqua.cal.coeff
modisf0_1.cal.coeff*
modisf0_aqua.cal.coeff
modislcw.cal.coeff
modisoob2.cal.coeff
modiswhite.cal.coeff*
new_modis_pol_corr5a.hdf
ocean_h50_v00_s00_d35_3.hdf
ocean_h70_v00_s00_d35_3.hdf
ocean_h90_v00_s00_d35_3.hdf
ocean_h99_v00_s00_d35_3.hdf
rayleigh_modis_412_iqu3.hdf
rayleigh_modis_443_iqu3.hdf
rayleigh_modis_488_iqu3.hdf
rayleigh_modis_531_iqu3.hdf
rayleigh_modis_551_iqu3.hdf
rayleigh_modis_667_iqu3.hdf
rayleigh_modis_678_iqu3.hdf
rayleigh_modis_748_iqu3.hdf
rayleigh_modis_869_iqu3.hdf
tropo_h50_v00_s00_d35_3.hdf
tropo_h70_v00_s00_d35_3.hdf

tropo_h90_v00_s00_d35_3.hdf
tropo_h99_v00_s00_d35_3.hdf

MODSST PGE10 inputs:
emissivity.dat.coeff*
modis_aqua_rsr2.hdf
modis_radcor_aqua_nocorr.sst.hdf
modis_radcor_v4_0.sst.hdf
modis_rsr2.hdf
modsst_aqua_params17.dat.coeff
modsst_aqua_sst4_2.coeff
modsst_aqua_sst_5.coeff
modsst_params17.dat.coeff
modsst_params17_reyv2.dat.coeff
modsst_sst4_13.coeff
modsst_sst_8.coeff

Shared_ocean binner inputs:
mmap_params3_1d_a.coeff
mmap_params3_1d_g.coeff
mmap_params3_1d_n.coeff
mmap_params3_36km_a.coeff
mmap_params3_36km_g.coeff
mmap_params3_36km_n.coeff
mmap_params3_4km_a.coeff
mmap_params3_4km_g.coeff
mmap_params3_4km_n.coeff
mmap_params3_9km_a.coeff
mmap_params3_9km_g.coeff
mmap_params3_f.coeff
mmap_params3_f1.coeff
mmap_params3_f2.coeff
mmap_params3_f3.coeff
mmap_params3_m01.coeff
mmap_params3_m02.coeff
mmap_params3_m03.coeff
mmap_params3_m04.coeff
mmap_params3_m05.coeff
mmap_params3_m06.coeff
mmap_params3_m07.coeff
mmap_params3_m08.coeff
mmap_params3_m09.coeff
mmap_params3_m10.coeff
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mtbin_params2.dat.coeff

C. Future Activities

C.1 Processing Development

We believe that to minimize the striping in the level-2 products will require unique per detector cross scan and mirror side correction factors, not the average behavior to be used in V4 codes. We also believe that polarization is playing a role in some of the remaining problems and will continue work on reanalysis of MCST supplied pre-launch polarization data. We will continue to improve data quality tests to better identify suspect or invalid SST retrievals and continue work with microwave products to first identify and subsequently correct for the presence of aerosols in both the SST and Ocean color products.

C.2 Matchup Database

Continued work with D. Clark to collect MOBY and MOCE visible in situ data and examine MODIS cookie matchups from the standard and variable SeaWiFS validation sites. In regard to SST, we will continue to routinely extract 5x5 boxes of MODIS pixels for MAERI and buoy matchups for SST. All Matchup databases will be backfilled and expanded to include both Aqua and Terra sensors from launch. These ASCII matchup files will be formatted and delivered to the GDAAC for archiving and made available thru the EDG and WHOM ordering systems. Validation also continues by comparing retrievals from other sensors, eg. SeaWifs, AVHRR.

C.3 Direct Broadcast

We plan to continue our direct broadcast web pages for AQUA and TERRA This include composites images for the U.S. East coast made available in GIF images, and binary format in addition to the standard EOS HDF of the 2.5min level 2 granules. Depending on user demand we may explore adding additional products to the current suite of available composites.

C.4 Systems Support

We plan to continue upgrading the RSMAS SCF with additional computational resources to support the demands of both AQUA and TERRA. These additional CPU's will be needed to support the calibration, testing, algorithm development, and quality assurance activities associated with the two data streams. Disk storage will be augmented to support Aqua, bi-weekly m1 L1b calibration updates and on-line product availability to support calibration and validation.

C.5 Team Interactions

Continue participate in weekly teleconferences with MCST, PIP and Oceans and intermittent teleconferences and meetings with MODIS QAWG and interactions with MODIS Ocean PI's to coordinate algorithm and quality level and flag definition updates. We will continue interactions with the SeaWiFs product office in regard to activities relating to merged SeaWiFS MODIS products, and Ocean color validation activities. Work is planned with EOS and international teams to improve SST validation, exchange MAERI matchup observations and Terra/Aqua SST and SST4 global fields. Interact with GODAE Global High Resolution SST working group to better define estimation of diurnal thermocline leading to a proper merger of Aqua and Terra day and night SST fields